May 2007

74F132
Quad 2-Input NAND Schmitt Trigger

General Description

The F132 contains four 2-input NAND gates which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. In addition, they have a greater noise margin than conventional NAND gates.

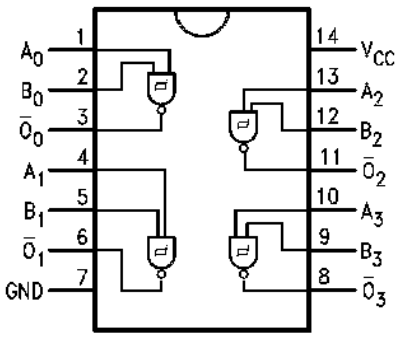
Each circuit contains a 2-input Schmitt Trigger followed by level shifting circuitry and a standard FAST™ output structure. The Schmitt Trigger uses positive feedback to effectively speed-up slow input transitions, and provide different input threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input threshold (typically 800mV) is determined by resistor ratios and is essentially insensitive to temperature and supply voltage variations.

Ordering Information

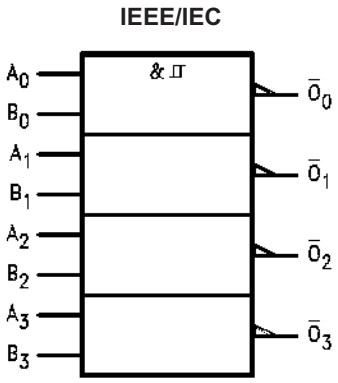
Order Number	Package Number	Package Description
74F132SC	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74F132SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter “X” to the ordering number.

Connection Diagram



Logic Symbol



Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input I_{IH}/I_{IL}, Output I_{OH}/I_{OL}
A_n, B_n	Inputs	1.0 / 1.0	20µA / –0.6mA
$\overline{O}_n$	Outputs	50 / 33.3	–1mA / 20mA

Function Table

Inputs		Outputs
A	B	$\overline{O}$
L	L	H
L	H	H
H	L	H
H	H	L

H = HIGH Voltage Level

L = LOW Voltage Level

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Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
T_{STG}	Storage Temperature	–65°C to +150°C
T_A	Ambient Temperature Under Bias	–55°C to +125°C
T_J	Junction Temperature Under Bias	–55°C to +150°C
V_{CC}	V_{CC} Pin Potential to Ground Pin	–0.5V to +7.0V
V_{IN}	Input Voltage(1)	–0.5V to +7.0V
I_{IN}	Input Current(1)	–30mA to +5.0mA
V_O	Voltage Applied to Output in HIGH State (with V_{CC} = 0V)	
	Standard Output	–0.5V to V_{CC}
	3-STATE Output	–0.5V to 5.5V
	Current Applied to Output in LOW State (Max.)	twice the rated I_{OL} (mA)
	ESD Last Passing Voltage (Min.)	4000V

Note:

1. Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Rating
T_A	Free Air Ambient Temperature	0°C to +70°C
V_{CC}	Supply Voltage	+4.5V to +5.5V

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DC Electrical Characteristics

Symbol	Parameter		V_{CC}	Conditions	Min.	Typ.	Max.	Units
V_{T+}	Positive-going Threshold		5.0		1.5		2.0	V
V_{T-}	Negative-going Threshold		5.0		0.7		1.1	V
ΔV_T	Hysteresis ($V_T^+ - V_T^-$)		5.0		0.4			V
V_{CD}	Input Clamp Diode Voltage		Min.	I_{IN} = –18mA			–1.2	V
V_{OH}	Output HIGH Voltage	10% V_{CC}	Min.	I_{OH} = –1mA	2.5			V
		5% V_{CC}		I_{OH} = –1mA	2.7			
V_{OL}	Output LOW Voltage	10% V_{CC}	Min.	I_{OL} = 20mA			0.5	V
I_{IH}	Input HIGH Current		Max.	V_{IN} = 2.7V			5.0	µA
I_{BVI}	Input HIGH Current Breakdown Test		Max.	V_{IN} = 7.0V			7.0	µA
I_{CEX}	Output HIGH Leakage Current		Max.	$V_{OUT} = V_{CC}$			50	µA
V_{ID}	Input Leakage Test		0.0	I_{ID} = 1.9µA, All Other Pins Grounded	4.75			V
I_{OD}	Output Leakage Circuit Current		0.0	V_{IOD} = 150mV, All Other Pins Grounded			3.75	µA
I_{IL}	Input LOW Current		Max	V_{IN} = 0.5V			–0.6	mA
I_{OS}	Output Short-Circuit Current		Max	V_{OUT} = 0V	–60		–150	mA
I_{CCH}	Power Supply Current		Max	V_O = HIGH			17.0	mA
I_{CCL}	Power Supply Current		Max	V_O = LOW			18.0	mA

AC Electrical Characteristics

Symbol	Parameter	T_A = +25°C, V_{CC} = +5.0V, C_L = 50pF			T_A = 0°C to +70°C, V_{CC} = +5.0V, C_L = 50pF		Units
		Min.	Typ.	Max.	Min.	Max.	
t_{PLH}	Propagation Delay, A_n, B_n to $\overline{O}_n$	4.0		10.5	3.5	12.0	ns
t_{PHL}		5.0		12.5	5.0	13.0	

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Physical Dimensions

Dimensions are in millimeters unless otherwise noted.

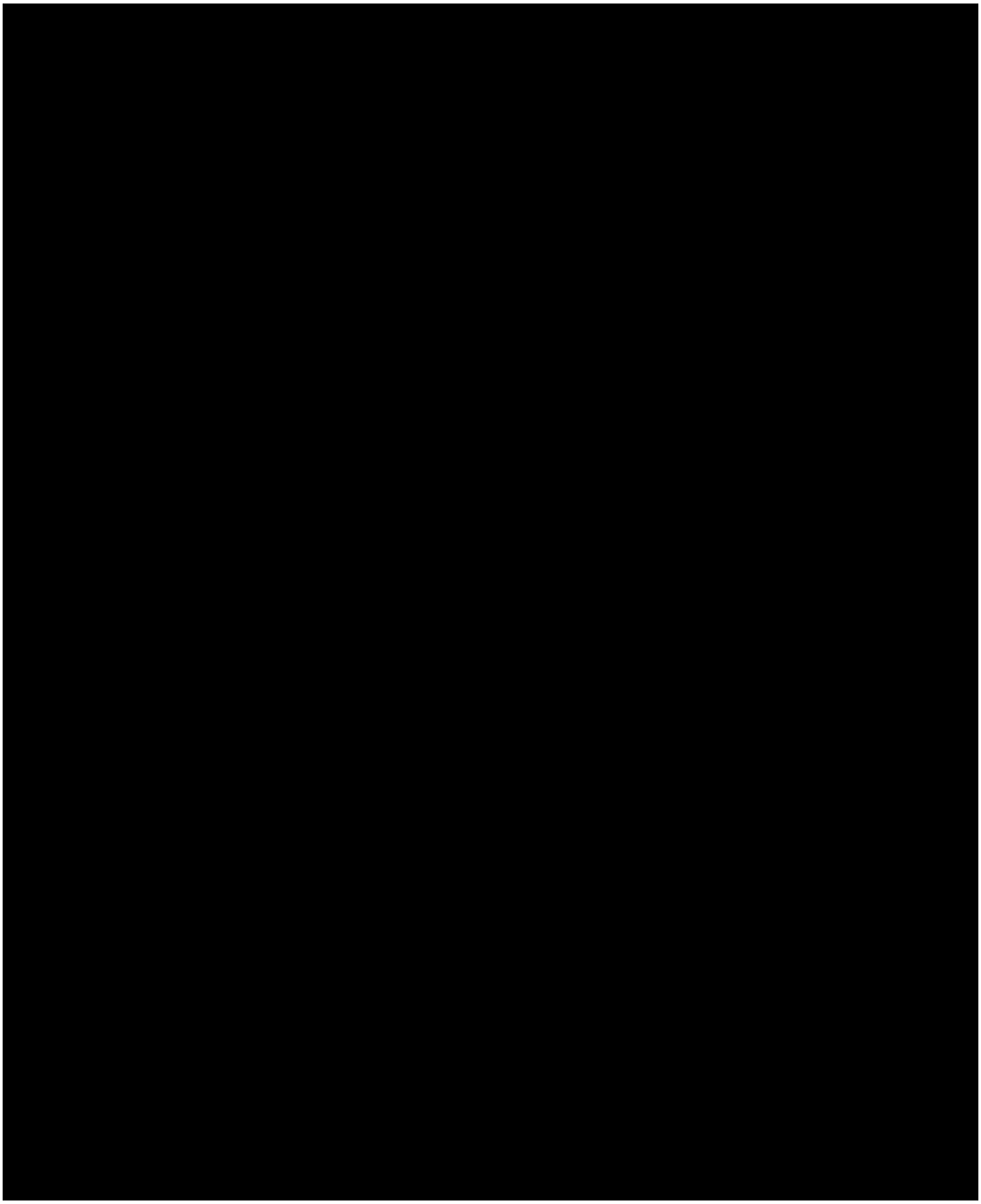

Figure 1. 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A

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Physical Dimensions (Continued)

Dimensions are in millimeters unless otherwise noted.

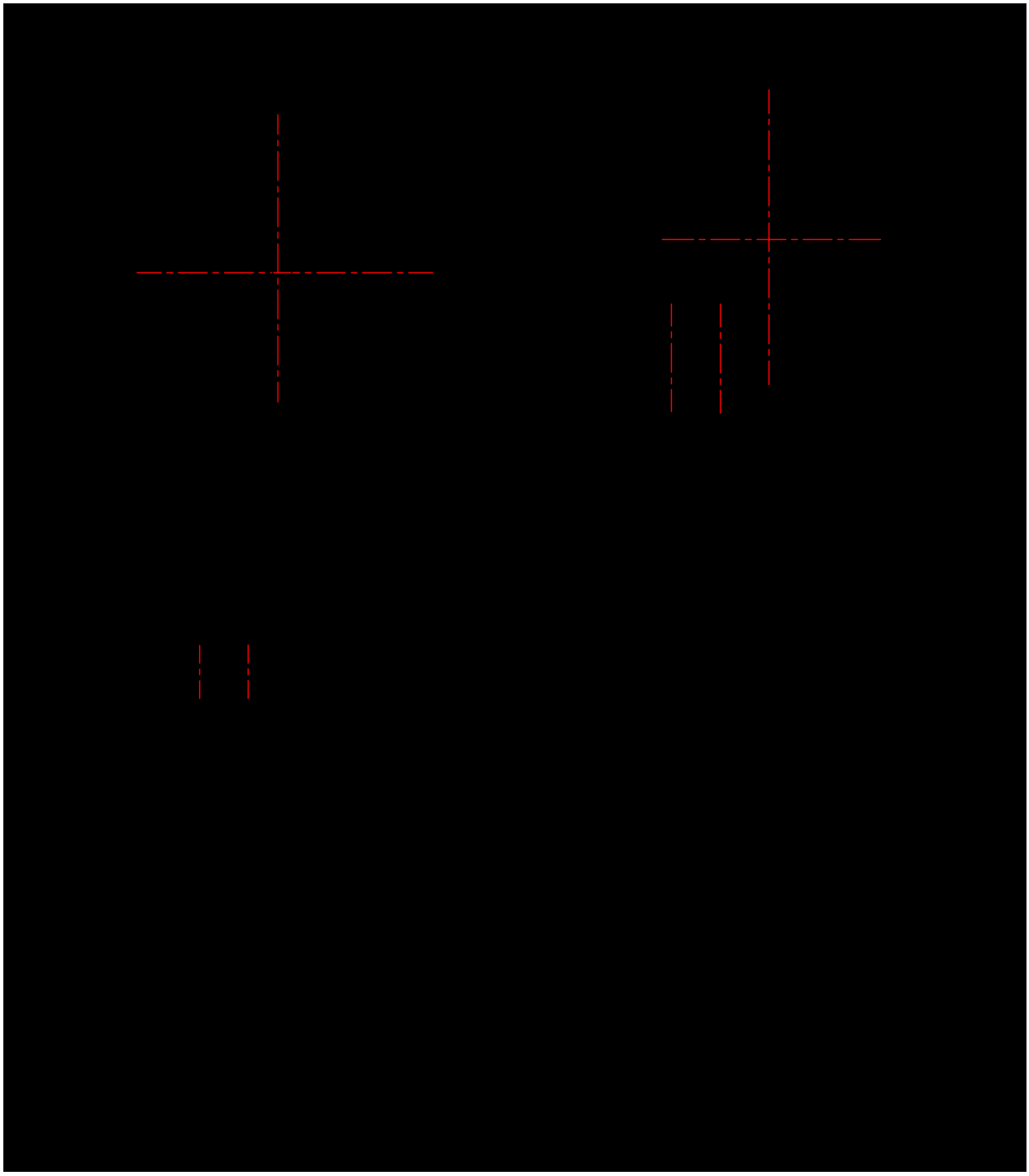

Figure 2. 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D

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